1-1-1991

Test 1654: Caterpiller Challenger 75 and 75C Diesel 10-Speed

Tractor Museum
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NERASKA OECD TRACTOR TEST 1654—SUMMARY 099
CATERPILLAR CHALLENGER 75 DIESEL
ALSO CATERPILLAR CHALLENGER 75C DIESEL
10 SPEED

POWER TAKE-OFF PERFORMANCE

Power HP *(kW)*	Crank shaft speed rpm	Gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Mean Atmospheric Conditions
MAXIMUM POWER AND FUEL CONSUMPTION					
Rated Engine Speed—(PTO speed—1024 rpm)					
281.36 *(209.81)*	2099	15.61 *(59.07)*	0.388 *(0.236)*	18.03 *(3.55)*	
Maximum Power (2 Hours)					
301.85 *(225.09)*	1949	16.17 *(61.19)*	0.374 *(0.228)*	18.67 *(3.68)*	
Standard Power Take-off Speed (1000 rpm)					
285.55 *(212.94)*	2050	15.69 *(59.38)*	0.384 *(0.234)*	18.20 *(3.59)*	Air temperature
VARYING POWER AND FUEL CONSUMPTION					
281.36 *(209.81)*	2099	15.61 *(59.07)*	0.388 *(0.236)*	18.03 *(3.55)*	75°F *(24°C)*
244.31 *(182.18)*	2145	13.95 *(52.80)*	0.399 *(0.243)*	17.52 *(3.45)*	Relative humidity
187.68 *(139.96)*	2194	11.50 *(43.54)*	0.428 *(0.261)*	16.32 *(3.21)*	43%
127.82 *(95.31)*	2242	9.06 *(34.28)*	0.495 *(0.301)*	14.11 *(2.78)*	Barometer
65.25 *(48.66)*	2294	6.61 *(25.02)*	0.708 *(0.431)*	9.87 *(1.94)*	28.87″ Hg *(97.75 kPa)*
0.80 *(0.60)*	2299	3.99 *(15.11)*	34.842 *(21.194)*	0.20 *(0.04)*	

Maximum Torque 960 lb.-ft *(1301 Nm)* at 1352 rpm
Maximum Torque Rise 36.3%

DRAWBAR PERFORMANCE
FUEL CONSUMPTION CHARACTERISTICS

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp.°F *(°C)* cool-ing med	Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Power—3rd Gear									
251.01 *(187.18)*	20596 *(91.62)*	4.57 *(7.36)*	2096	1.91	0.437 *(0.266)*	15.98 *(3.15)*	188 *(87)*	68 *(20)*	29.08 *(98.48)*
75% of Pull at Maximum Power—3rd Gear									
194.93 *(145.36)*	15408 *(68.54)*	4.74 *(7.64)*	2162	1.28	0.461 *(0.281)*	15.15 *(2.98)*	187 *(86)*	80 *(27)*	29.06 *(98.41)*
50% of Pull at Maximum Power—3rd Gear									
133.91 *(99.86)*	10257 *(45.63)*	4.90 *(7.88)*	2222	0.81	0.537 *(0.326)*	13.03 *(2.57)*	189 *(87)*	80 *(27)*	29.06 *(98.41)*
75% of Pull at Reduced Engine Speed—4th Gear									
194.64 *(145.14)*	15401 *(68.51)*	4.74 *(7.63)*	1889	1.28	0.442 *(0.269)*	15.81 *(3.11)*	188 *(87)*	80 *(27)*	29.06 *(98.41)*
50% of Pull at Reduced Engine Speed—4th Gear									
133.65 *(99.66)*	10272 *(45.69)*	4.88 *(7.85)*	1937	1.02	0.499 *(0.304)*	14.00 *(2.76)*	187 *(86)*	80 *(27)*	29.06 *(98.41)*

Location of Test: Tractor Testing Laboratory, University of Nebraska, Lincoln, Nebraska 68583-0832, U.S.A.

Dates of Test: October 4-11, 1991

Manufacturer: Caterpillar Inc., 100 N.E. Adams St., Peoria, Illinois 61629

FUEL OIL and TIME: Fuel No. 2 Diesel **Cetane No.** 53.9 **Specific gravity converted to 60°/60°F *(15°/15°C)*** 0.8396 **Fuel weight** 6.990 lbs/gal *(0.838 kg/l)* **Oil SAE** 10W30 **API service classification** CE, CD, SF **To motor** 7.246 gal *(27.428 l)* **Drained from motor** 6.770 gal *(25.628 l)* **Transmission and final drive lubricant** SAE 30W API CD/TO-2 fluid **Hydraulic lubricant** SAE 30W API CD/TO-2 fluid **Total time engine was operated** 19.5 hours.

ENGINE: Make Caterpillar Diesel **Type** six cylinder vertical with turbocharger and air to air intercooler **Serial No.** *43Z00251* **Crankshaft** lengthwise **Rated rpm** 2100 **Bore and stroke** (as specified) 4.92″ × 5.5″ *(125 mm × 140 mm)* **Compression ratio** 16 to 1 **Displacement** 629 cu in *(10308 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements and aspirator **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, engine coolant heat exchanger for transmission oil, radiator for hydraulic oil, radiator for steering oil **Fuel filter** one paper cartridge and screen **Muffler** underhood **Exhaust** vertical **Cooling medium temperature control** thermostat.

ENGINE OPERATING PARAMETERS: Fuel rate 99.3-109.8 lb/hr *(45.1-50.0 kg/hr)* **High idle** 2260-2340 rpm **Turbo boost** nominal 12.8-16.8 psi *(88-116 kPa)* as measured 14.5 psi *(100 kPa)*.

CHASSIS: Type track layer-rubber track **Serial No.** *4CJ00356* **Tread width** 84.6″ *(2150 mm)* **Length of track on ground** 107.6″ *(2733 mm)* **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with full range operator controlled powershift **Nominal travel speeds mph *(km/h)*** first 2.6 *(4.2)* second 4.0 *(6.4)* third 4.7 *(7.5)* fourth 5.3 *(8.6)* fifth 6.1 *(9.9)* sixth 7.0 *(11.3)* seventh 8.1 *(13.0)* eighth 9.3 *(14.9)* ninth 12.0 *(19.3)* tenth 18.1 *(29.3)* reverse 1.9 *(3.1)*, 4.5 *(7.2)* **Clutch** multiple wet disc hydraulically power actuated by foot pedal **Brakes** Caliper disc hydraulically power operated by foot pedal **Steering** differential steering hydrostatically actuated by steering wheel **Power take-off** 1000 rpm at 2050 engine rpm **Unladen tractor mass** 34370 lb *(15590 kg)*.

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

DRAWBAR PERFORMANCE AT 1950 RPM
MAXIMUM POWER IN SELECTED GEARS

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr *(kg/kW.h)*	Fuel Consumption Hp.hr/gal *(kW.h/l)*	Temp.°F *(°C)* cool-ing med	Temp.°F *(°C)* Air dry bulb	Barom. inch Hg *(kPa)*
				1st Gear					
208.00 *(155.10)*	33931 *(150.93)*	2.30 *(3.70)*	2128	14.19	0.512 *(0.312)*	13.64 *(2.69)*	186 *(85)*	58 *(14)*	29.17 *(98.78)*
				2nd Gear					
256.30 *(191.12)*	27273 *(121.32)*	3.52 *(5.67)*	1946	4.70	0.441 *(0.268)*	15.86 *(3.12)*	189 *(87)*	77 *(25)*	29.08 *(98.48)*
				3rd Gear					
266.17 *(198.49)*	23706 *(105.45)*	4.21 *(6.78)*	1948	2.79	0.427 *(0.260)*	16.38 *(3.23)*	188 *(87)*	69 *(21)*	29.08 *(98.48)*
				4th Gear					
267.76 *(199.67)*	20684 *(92.01)*	4.85 *(7.81)*	1947	1.81	0.423 *(0.257)*	16.52 *(3.25)*	189 *(87)*	65 *(18)*	29.08 *(98.48)*
				5th Gear					
266.02 *(198.37)*	17797 *(79.16)*	5.61 *(9.02)*	1951	1.55	0.426 *(0.259)*	16.40 *(3.23)*	189 *(87)*	58 *(14)*	29.08 *(98.48)*
				6th Gear					
263.00 *(196.12)*	15263 *(67.89)*	6.46 *(10.40)*	1949	1.12	0.429 *(0.261)*	16.28 *(3.21)*	189 *(87)*	61 *(16)*	29.08 *(98.48)*
				7th Gear					
262.57 *(195.80)*	13264 *(59.00)*	7.42 *(11.95)*	1955	1.07	0.434 *(0.264)*	16.09 *(3.17)*	191 *(88)*	69 *(21)*	29.08 *(98.48)*
				8th Gear					
257.97 *(192.37)*	11379 *(50.61)*	8.50 *(13.68)*	1950	0.97	0.437 *(0.266)*	16.00 *(3.15)*	191 *(88)*	73 *(23)*	29.08 *(98.48)*

DRAWBAR PERFORMANCE AT 2100 RPM
MAXIMUM POWER IN SELECTED GEARS

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr *(kg/kW.h)*	Fuel Consumption Hp.hr/gal *(kW.h/l)*	Temp.°F *(°C)* cool-ing med	Temp.°F *(°C)* Air dry bulb	Barom. inch Hg *(kPa)*
				1st Gear					
210.22 *(156.76)*	34309 *(152.61)*	2.30 *(3.70)*	2125	14.07	0.514 *(0.313)*	13.59 *(2.68)*	186 *(85)*	53 *(12)*	29.17 *(98.78)*
				2nd Gear					
244.68 *(182.45)*	23724 *(105.53)*	3.87 *(6.22)*	2097	3.00	0.449 *(0.273)*	15.57 *(3.07)*	188 *(86)*	75 *(24)*	29.08 *(98.48)*
				3rd Gear					
251.01 *(187.18)*	20596 *(91.62)*	4.57 *(7.36)*	2096	1.91	0.437 *(0.266)*	15.98 *(3.15)*	188 *(87)*	68 *(20)*	29.08 *(98.48)*
				4th Gear					
250.56 *(186.84)*	17871 *(79.49)*	5.26 *(8.46)*	2097	1.39	0.442 *(0.269)*	15.81 *(3.11)*	188 *(86)*	63 *(17)*	29.08 *(98.48)*
				5th Gear					
246.30 *(183.67)*	15282 *(67.98)*	6.04 *(9.73)*	2099	1.28	0.447 *(0.272)*	15.64 *(3.08)*	188 *(86)*	57 *(14)*	29.10 *(98.54)*
				6th Gear					
243.43 *(181.52)*	13105 *(58.29)*	6.97 *(11.21)*	2098	1.07	0.455 *(0.277)*	15.37 *(3.03)*	188 *(87)*	60 *(16)*	29.09 *(98.51)*
				7th Gear					
241.00 *(179.71)*	11323 *(50.37)*	7.98 *(12.84)*	2100	0.91	0.458 *(0.279)*	15.26 *(3.01)*	190 *(88)*	69 *(21)*	29.08 *(98.48)*
				8th Gear					
236.06 *(176.03)*	9657 *(42.96)*	9.17 *(14.75)*	2100	0.86	0.463 *(0.282)*	15.09 *(2.97)*	190 *(88)*	71 *(22)*	29.08 *(98.48)*

TRACTOR SOUND LEVEL WITH CAB	dB(A)
Maximum Available Power—4th Gear	78.5
75% of pull at maximum power—4th Gear	78.0
50% of pull at maximum power—4th Gear	76.5
50% of pull at reduced engine speed—5th Gear	74.5
Bystander (10th Gear)	93.5

TIRES AND WEIGHT		Tested Without Ballast
Rear Tires	—No., size, ply & psi *(kPa)*	NA
Front Tires	—No., size, ply & psi *(kPa)*	NA
Height of Drawbar		16.5 in *(420 mm)*
Static Weight with Operator	—Rear	NA
	—Front	NA
	—Total	34535 lb *(15665 kg)*

REMARKS: All test results were determined from observed data obtained in accordance with official OECD, SAE and Nebraska test procedures. For the maximum power tests, the fuel temperature for the returned fuel was maintained at 153° F *(67° C)*. The performance figures on this summary were taken from a test conducted under the OECD Code II restricted standard test code procedure.

Report reissued: Supplemental sales permit for Caterpillar Challenger 75C Diesel, January, 1993.

We, the undersigned, certify that this is a true and correct report of official Tractor Test No. **1654,** Summary 099, February 10, 1992.

LOUIS I. LEVITICUS
Engineer-in-Charge

L. L. BASHFORD
R. D. GRISSO
K. VON BARGEN
Board of Tractor Test Engineers

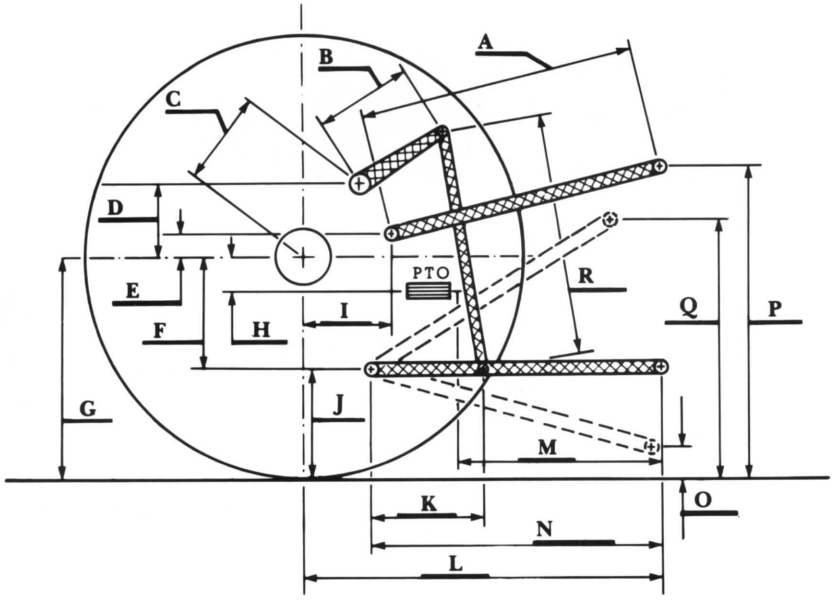
THREE POINT HITCH PERFORMANCE (SAE Static Test)

Observed Maximum Pressure psi. *(bar)*			2500 *(172)*		
Location			remote outlet		
Hydraulic oil temperature °F*(°C)*			142 *(61)*		
Location			hydraulic reservoir		
Category			III		
Quick attach			no		
Hitch point distance to ground level in. *(mm)*	8.6 *(218)*	15.8 *(401)*	24.4 *(620)*	33.6 *(853)*	43.9 *(1115)*
Lift force on frame lb. *" " " " " " (kN)*	30640 *(136.3)*	28060 *(124.8)*	23600 *(105.0)*	19350 *(86.1)*	13680 *(60.9)*

THREE POINT HITCH PERFORMANCE (OECD Static Test)

CATEGORY: III
Quick Attach: none

Maximum Force Exerted Through Whole Range:	11367 lbs	*(50.6 kN)*
i) Opening pressure of relief valve:	NA	
Sustained pressure at compensator cutoff:	2470 psi	*(170 bar)*
ii) Pump delivery rate at minimum pressure:	27.4 GPM	*(103.7 l/min)*
iii) Pump delivery rate at maximum hydraulic power:	23.9 GPM	*(90.5 l/min)*
Delivery pressure:	2320 psi	*(160 bar)*
Power:	32.4 Hp	*(24.1 kW)*



HITCH DIMENSIONS AS TESTED—NO LOAD

	inch	*mm*
A	26.7	*678*
B	21.5	*545*
C	18.6	*472*
D	16.3	*415*
E	16.6	*422*
F	3.9	*98*
G	23.9	*606*
*H	–5.1	*–130*
I	14.6	*370*
J	20.0	*508*
K	21.1	*535*
L	40.6	*1030*
M	25.5	*648*
N	30.1	*765*
O	9.0	*229*
P	47.0	*1194*
Q	37.7	*958*
R	26.1	*663*

* PTO is above rear axle

Caterpillar Challenger 75 Diesel

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